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Reviews.

An Illustrated Flora of the Northern United States, Canada and the British Possessions, from Newfoundland to the Parallel of the Southern Boundary of Virginia, and from the Atlantic Ocean Westward to the 102d Meridian. By Nathaniel Lord Britton, Ph. D., Emeritus Professor of Botany in Columbia University, and Director-in-Chief of the New York Botanical Garden, and Hon. Addison Brown, President of the Torrey Botanical Club. In Three Volumes. Vol. I., Ophioglossaceae to Aizoaceae; Ferns to Carpet-weed. Royal 8vo, pp. 612, New York, Charles Scribner's Sons, 1896. Price per volume, $3.00.

An entirely distinct epoch in the study of the North American flora is marked and, as to its general influence, inaugurated by the publication of this great work. Popularization, but with a distinct gain to science; a more intelligent and natural arrangement of groups; the application of broader and more natural principles in the delimitation of species; a full and careful consideration of distribution; a rational and just system of nomenclature—these are some of the progressive steps which are forcibly and clearly brought to mind as we examine the pages of our new flora. In comparing new works with old, we are often led to disparage the former because of the poorer advantages which were possessed by the authors of the latter. It is, however, quite safe to say that in no preceding work of the kind have the materials at hand been more completely utilized, nor has there been a more careful consideration of principles, or a more exhaustive study of details. Those American botanists who have prayed for more botany and less nomenclature may now give thanks! The first portion of their prayer, at least, is answered. The scope and nature of the work cannot be better stated in brief than by quoting the opening paragraph of the authors' introduction:

"The present work is the first complete Illustrated Flora published in this country. Its aim is to illustrate and describe every species, from the Ferns upward, recognized as distinct by botanists and growing wild within the area adopted, and to complete the work within such moderate limits of size and cost as shall make it accessible to the public generally, so that it may serve as an independent handbook of our Northern Flora and as a work of general reference, or as an adjunct and supplement to the manuals of systematic botany in current use."

The introduction also informs us that about three-fourths of these species, some four thousand in number, are here figured for the first time. Vol. I contains 1425 figured species.

Not only is the conception of such a work as a practicable possibility to be credited to Judge Brown; the elaboration of the plan and the surmounting of the difficulties which have from time to time arisen have been his constant care. Above all, it is through his munificent provision of the substantial means that the accomplishment of the undertaking has been rendered possible. Much as we owe to the publishers, whose names appear upon the title-page, it must not be unknown to the public that the real publisher is the Hon. Addison Brown, nor that he undertook the publication as a labor of love, with little prospect at the time that it would ever prove other than an expensive contribution to the popularization of science. Nor is it out of place to hazard the opinion, after a study of the work, that the actual result will yet prove for the publisher a surprise upon the sunny side.

The value of illustrations thus presented need hardly be dwelt upon. Important as they are in introducing the general public to a knowledge of our plants, the value of reliable figures is appreciated by none more keenly than by the experienced botanist. Not because they are more important than some other features of the work, but because of their greater prominence, the illustrations are examined first.

The adoption of proper sizes for the cuts has required constant study and thought. To display undimmed the individuality of the plant was the first consideration, while upon the other hand, to destroy the popular character of the work by unduly enhancing the cost, was to sacrifice the principal object for which it was undertaken. Apparently the most successful result possible in this direction has been attained. When the entire plant could not be figured, it has been individually studied as to its most characteristic parts. Tall stems have frequently been included by representing them in a doubled or folded position. In all cases of reduction, life-size drawings have been employed. The magnification of such minute parts as sporanges, akenes, seed-coats and appendages is a feature of the very highest importance, and one the educational influence of which can hardly be over-estimated. Good instances are the fruits of the *Potamogetons* and dissections of the column in Orchidaceae. The reduction is conspicuously indicated beside the general illustrations; the degree of magnification of the minuter parts is not stated, being considered unnecessary; but we regret the omission, or, at least, that it was not made clear that the same degree was used in illustrating the same organ throughout a group.

The work upon the illustrations, both drawing and engraving, is of the very highest quality, and a remarkable degree of naturalness has in most cases been attained. In many cases, as, for instance, in that of *Xyris torta*, the figures are exceedingly beautiful. Drawn usually from herbarium specimens, the figures have afterward been compared as often as possible with the living plants. To have drawn all the figures from life, would, doubtless, have still further improved the appearances, but this was obviously impossible.

Natural considerations, which have been allowed to control the entire planning of the work, are manifest in the choice of the boundaries selected for the flora. Even the announced limits are over-stepped when necessary to complete a natural region, as in the inclusion of the extra-limital portions of Nebraska. That the relations between geography and botany have been attentively studied is evidenced in more than one way. Both local catalogues and local herbaria have been thoroughly searched to determine the precise range-limits, and great care has been exercised in indicating clearly the habitats of the species. In no preceding work has the subject of range been so well elaborated. We find in this work, moreover, about the first systematic attempt to give the altitudinal distribution. So little attention has been paid by collectors to this important subject that the information here accumulated by Dr. Britton can hardly be regarded as more than a working basis, but as such its value will prove very great. Not the least valuable of the geographical features is the statement, in a general way, of the extra-territorial ranges of the species. Having thus clearly established the ranges of the forms, they have been allowed to exercise a certain weight in deciding in difficult cases of species-limitation. So important has this subject of plant-geography come to be regarded in modern botany, that we may indulge a little natural pride in the appearance of so thorough a study of it by American authors.

It is scarcely necessary to review here the slow and laborious process by which systematic botanists since Linnaeus have worked toward the natural arrangement and sequences of plant-groups. It is sufficient to say that only by a masterly review of morphology, anatomy, physiology, distribution in time and place, and even of such subjects as chemistry and nutritive and physiological properties, have we been brought to an arrangement which commends itself to all who recognize and value a deciding influence higher than the dictum. Such inconvenience as results from working under the new arrangement may fairly be regarded as due to a failure to have taken natural relations into consideration. To those who have done so, the new arrangement will present no other unfamiliarity than that of a new thing which has been long and eagerly sought. As to beginning at the upper or lower end of the sequence, the reviewer confesses to but faint interest. It would appear to matter but little whether we turn to the right or to the left as we enter the herbarium. But it is of vital importance that those things should be brought together which show the closest relationship, and the acceptance or non-acceptance of any portion of the new arrangement may best be decided upon the basis of those principles upon which it has been founded. The following extract from the table of contents displays the arrangement of the families:*

PTERIDOPHYTA 1

1. OPHIOGLOSSACEAE 1
2. OSMUNDACEAE 4
3. HYMENOPHYLLACEAE 6
4. SCHIZAEACEAE 7
5. POLYPODIACEAE 8
6. MARSILEACEAE 33
7. SALVINIACEAE 34
8. EQUISETACEAE 35
9. LYCOPODIACEAE 39
10. SELAGINELLACEAE 44
11. ISOETACEAE 45

SPERMATOPHYTA 49

GYMNOSPERMAE 49

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* Underneath this table the authors print another, in which the common or English names of the families are substituted.

1. PINACEAE	49
2. TAXACEAE	61

ANGIOSPERMAE 61

Monocotyledones 62

1. TYPHACEAE	62
2. SPARGANIACEAE	63
3. NAIADACEAE	65
4. SCHEUCHZERIACEAE	82
5. ALISMACEAE	84
6. VALLISNERIACEAE	92
7. GRAMINEAE	94
8. CYPERACEAE	234
9. ARACEAE	360
10. LEMNACEAE	365
11. MAYACACEAE	367
12. XYRIDACEAE	368
13. ERIOCAULACEAE	371
14. BROMELIACEAE	374
15. COMMELINACEAE	374
16. PONTEDERIACEAE	379
17. JUNCACEAE	381
18. MELANTHACEAE	399
19. LILIACEAE	410
20. CONVALLARIACEAE	427
21. SMILACEAE	438
22. HAEMODORACEAE	442
23. AMARYLLIDACEAE	443
24. DIOSCOREACEAE	446
25. IRIDACEAE	447
26. MARANTACEAE	454
27. BURMANNIACEAE	455
28. ORCHIDACEAE	456

Dicotyledones 482

Choripetalae 482

1. SAURURACEAE	482
2. JUGLANDACEAE	483
3. MYRICACEAE	487
4. LEITNERIACEAE	489
5. SALICACEAE	490
6. BETULACEAE	506
7. FAGACEAE	513
8. ULMACEAE	523
9. MORACEAE	527
10. URTICACEAE	530
11. LORANTHACEAE	534
12. SANTALACEAE	536
13. ARISTOLOCHIACEAE	537
14. POLYGONACEAE	541
15. CHENOPODIACEAE	569
16. AMARANTHACEAE	586
17. PHYTOLACCACEAE	593
18. NYCTAGINACEAE	594
19. AIZOACEAE	597

It is incidentally to be regarded as fortunate that this arrangement brings before our students in the first volume those families which are usually regarded as most difficult. By the aid of this volume, any field-student or collector can, during the coming months, and before the appearance of the remaining volumes, become fairly well acquainted with the representatives of these difficult groups which are afforded by his locality.

The work will doubtless be assailed by a certain class because of the narrowness with which the species-limits have been drawn. On this subject it may be well to quote the authors: "The present tendency of expert opinion is to separate more freely into convenient natural groups, as genera and families, according to similarity of structure, habit, form or appearance." (Introduction, p. v.) And it may be further remarked that the tendency to unite species is manifested rather by those who act as editors; to separate them, by those who pursue special studies. In the performance of this portion of the work, Dr. Britton has been exceptionally well situated. During the six years that this work has been under way, he has been surrounded by a large and energetic group of workers, trained and held together largely through the influence of the Torrey Botanical Club. These men and women have gladly undertaken from time to time the investigation of difficult or of poorly-known groups, and they have almost without exception brought to bear upon their work every modern method of research. This period has been noted farther for great activity in similar work throughout the country. An unusual amount of material in the way of field-notes has also been recently accumulated, a large part of it directly in the interest of this work. All this material has been assiduously studied. Although some of the cases of species-division appear surprising, yet in view of the minuteness with which the authors have conducted their studies, it may well be that such criticisms as shall be made will possess the demerit of being based upon a lower degree of scrutiny than the determinations themselves.

That the possibility of determining a plant by merely turning to a figure may induce habits of superficiality, is perhaps, true, though hardly so in case of such a work as this. Even in case of those fragmentary illustrated works which may be regarded solely or chiefly in the light of picture books, it is probable that the habits of observation and comparison they induce and develop more than counteract any such tendencies to superficiality; but in the present case every influence tends to lead the student on to deeper examination and more scientific methods. Reference has already been made to the illustration of the minuter structures beside the general illustrations. Even more important in this direction are the keys to the groups, so freely furnished as to form a complete system. No one, having learned to use botanical language, would of course think of consulting the cuts until the possibilities of the text—that of the keys, at least—had been exhausted. Those others, who may at first resort to the pictures, will, doubtless, quickly learn that time is usually saved by a different course, and a study of botanical terminology introductory to the use of the keys will almost surely follow. If there be some to whom this statement does not apply, the defect may be regarded as natural, and displayed in spite rather than because of the character of the book.

Keys, if not usually artificial, are pretty likely to accomplish their purpose the better in proportion as they are so. There is, however, in the keys of this flora an evident design of combining the advantages of a scientific relation and an artificial characterization, an attempt in which there is no end of room for the exercise of ingenuity. The result is that in most of them we note a combination of obvious "ear-marks" with more complex characters.

It is needless to say that the rules of nomenclature followed are those which have been officially adopted by American botanists and which are evidently in the near future to dominate botanical writings abroad as well as in America. The code is printed and briefly explained in the introduction. In a foot-note reference is made to the principal American contributions to the subject of nomenclature. The authors would here have done well to include one by the writer, who has labored diligently in the interest of this movement, especially in medical literature. It appeared in the *Bulletin of Pharmacy*, and set forth clearly and fully the history of the movement in this country. The importance of applying some system in the application of family names is urged, but its introduction, in advance of full discussion and official adoption, is wisely omitted.

The forms of type, use of capitals and symbols and rules of pronunciation are also here briefly explained.

Throughout the book the accent is indicated in botanical names, specific as well as others.

Much care has been devoted to the selection of the common names, which have also been printed in a separate index. It is hardly to be hoped that a high degree of satisfaction will be given in this direction. Those whose botanical work brings them into especial communication with those who speak of plants by their common names learn to be quite hopeless about satisfying local ideas (and this the authors have not attempted), except by devoting to synonyms an amount of space quite out of the question in such a work. The propriety of excluding a common name of general acceptance because it is misleading as to relationship, as, for example, "Dog's-tooth Violet," may well be questioned. Common names are common property, and where the advisability of having them disturbed on scientific grounds has been officially considered, as, for example, by the National Bureau on Geographical Names, it has been decided indefensible. Upon the other hand, when this is done by such a work as the Illustrated Flora, it serves the very useful purpose of reminding those who use such names that they are opposed to scientific authority, sufficient in many cases to lead to their disuse.

In the index to the botanical names the admirable system is followed of indexing the species as well as the genera and families.

The closing thought, that the two remaining volumes require only printing and binding, is by no means the least pleasing with which we regard the present occasion.

H. H. Rusby.

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